ToughCam® vario

User manual

SAMCON
Prozessleittechnik GmbH

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1 Document Overview

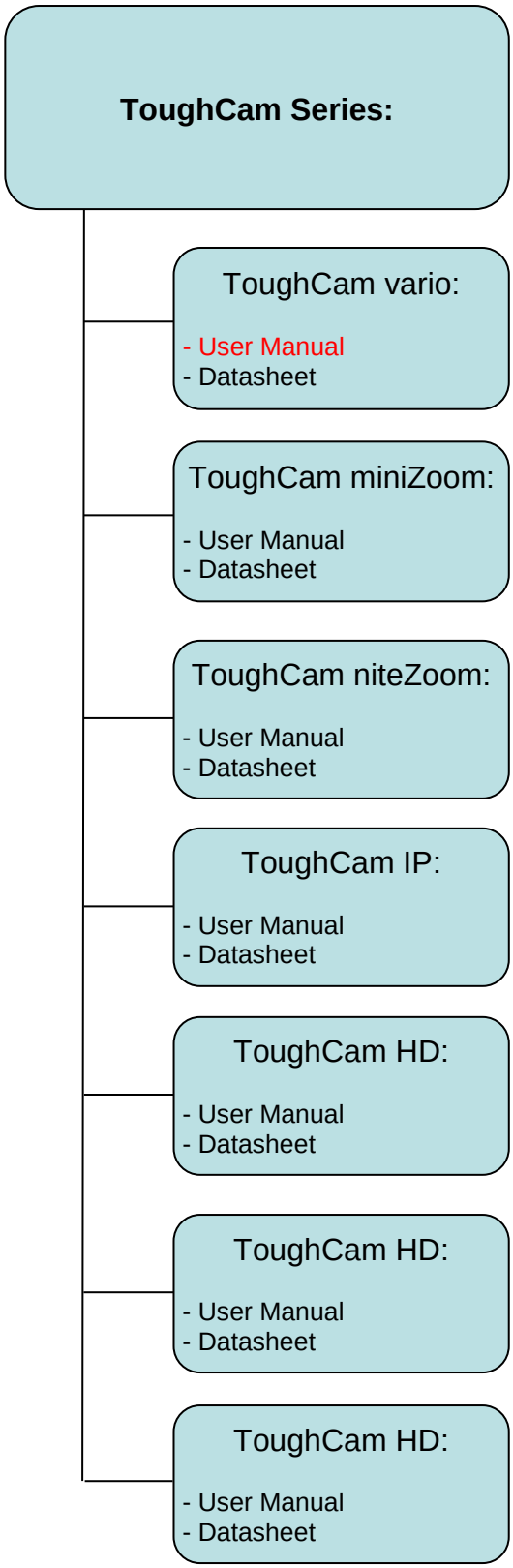


Figure 1.1 Document overview

The present document is marked in red.

2 Technical Data

2.1 Electrical parameters

Supply voltage:	+12 V DC to +30 V DC
Maximum power input:	5.5 W
Power input:	Approx. 460 mA @12VDC Approx. 230 mA @24VDC

2.2 System cable SKAxx

Outer diameter:	9.4 mm
Bending radius:	min. 150 mm
Video:	1x75 Ω Koax, 19x0.127mm tinned AWG 24, plated copper braid, shielded
Power supply camera:	2 x 0.75 mm²

2.3 Sensor

Sensor:	1/3‘‘ CCD Sony Super HAD Interline Transfer
Effective sensor resolution:	PAL: 440,000 Pixel (approx. 752 x 582)
Horizontal resolution:	PAL: 540 TV lines

2.4 Lens

Lens:	Varifocal
Focal (f):	3.8 mm to 9.5 mm
Angle of view:	74.2° (wide) to 30° (tele)
Iris:	F1.2 to F2.0
Minimal illumination:	0.15 lux
Recommended illumination:	0.5 lux to100,000 lux
Minimum object distance:	150 mm

2.5 Electronic functions

- DC iris control
- Automatic Shutter Control (ESC)
- Digital signal processing (DSP)
- Back Light Compensation (BLC)
- Auto White Balance (ATW)
- Removable IR-cut filter (ICR)
- Automatic gain control (AGC)
- Composite video (VBS) video output 1 Vpp
- SNR: 48 dB

2.6 Other technical data

Permissible ambient temperature:	-20 C° - 50 C° (depending on camera module)
Protection level EN 60529/IEC 529:	IP 67
Housing material:	Aluminum die cast or V2A Stainless steel 1.4301 (standard) or V4A Stainless steel 1.4401 (customized) V4A Stainless steel 1.4404 (customized)
Glass material:	Borosilicate glass
Weight:	2100 g (stainless steel T03-VA) 1900 g (Aluminum housing T03-AL)
Dimensions (L x D_{max}):	128 mm x 77 mm (stainless steel housing T03-VA without cable gland) 163mm x 98 mm (Aluminum housing T03-AL without cable gland)

3 Illustration of the model key

The following model options are currently available for the ToughCam vario:

Product name	Model option					
	ATEX Type	housing option(1)	Explosion group(2)	Meter SKA02(3)	Cable termin.(4)	Temp. range 5)
ToughCam vario	T03-	VA-	0-	005-	K-	L
	T03-	VA-	0-	005-	P-	L
	T03-	VA-	0-	005-	K-	L
	T03-	VA-	0-	005-	P-	L
	T03-	AL-	0-	005-	K-	L
	T03-	AL-	0-	005-	P-	L
	T03-	AL-	0-	005-	K-	L
	T03-	AL-	0-	005-	P-	L

**all model options are available in stainless steel and aluminum housing with K1 or K2 supply flange (q.v. chapter 8 – technical drawings)*

(1) VA = Execution in stainless steel
AL = Execution in aluminum die cast

(2) 0 = Execution without explosion protection

(3) Length of the connection line in meter (001- 200)
(5 meter is the standard length)

(4) K = Terminal block connection (standard)
All signaling lines are spliced to single strands and furnished with wire-end ferrules to allow connecting the camera to a terminal block
P = Plug- termination
Approximately 30cm of the system cable's outer stealth is stripped.
The power supply strands (RD, BK) are furnished with wire-end ferrules.
The AWG24 cable is furnished with a BNC connector

(5) L = Low temperature (-20° C to 50° C)

4 Commissioning

4.1 Step 1: Installation

Install the ToughCam® vario at the desired location.

Warning!
When the iris is open, the camera must not be directed toward the sun as this can cause damages to the sensor.

4.2 Step 2: Electrical connection

Attention!
The electrical connection of the equipment must be executed by qualified personnel only!

Attention!
It is mandatory that the housing of the ToughCam® Series has to be grounded via a PE-connection!

The ToughCam® vario is delivered with an electrical connection cable type SKAxx (System Kabel Analog). The maximum cable length is 200 m and can be determined individually to reflect the particular customer specifications.

The ToughCam ® vario is manufactured with a pigtail reflecting the desired cable length. Depending on the model option, the ending of the camera's cable connection is either stripped and furnished with wire-end ferrules or furnished with a BNC connector.

4.2.1 Potential equalization

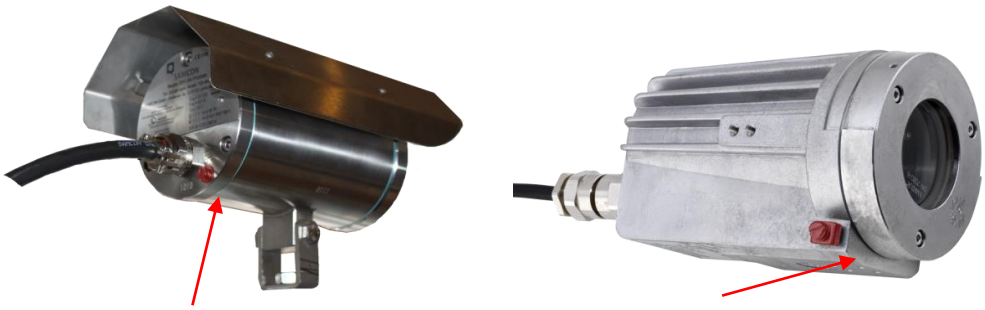


Figure 4.1 Potential equalization T03-VA and T03-AL

Depending on the housing execution, the equipment's potential equalization is to be carried out at the place indicated in above figure. The profile of the potential equalization has to reflect the national grounding instructions (min. 4 mm^2).

Connection table:

Potential:	**Color** (IEC 60757)	**Profile**	**Comment**
PA	GN/YE	4 mm² (fixed)	

4.2.2 Power supply & protection

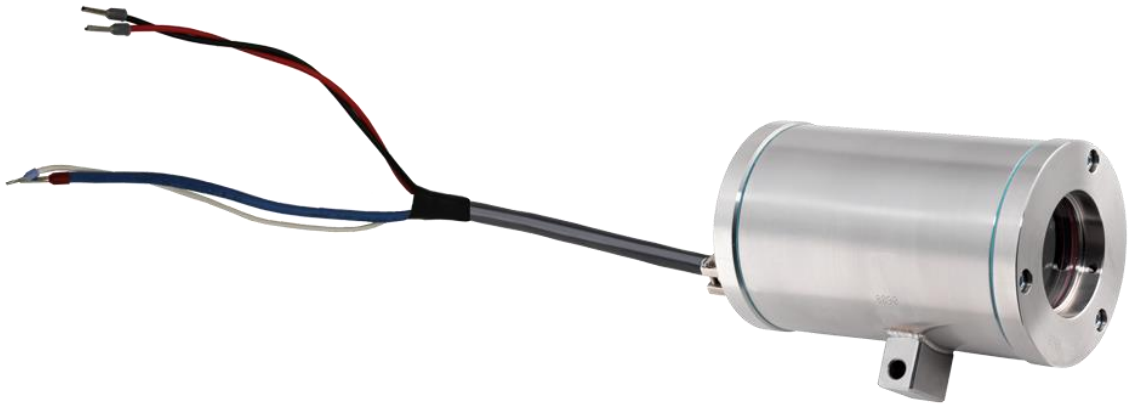


Figure 4.2 ToughCam vario – T03-VA-B-XXX-K-L

Figure 4.3 toughCam vario – T03-VA-B-XXX-P-L

The power supply is to be carried out via the red (RD) as well as black (BK) strand.

Connection table:

Potential	**Color** (IEC 60757)	**Potential level**	**Profile**	**Comments**
L+	RD	+12 V DC – +30 V DC	0.75 mm²	
L-	BK	0 V DC	0.75 mm²	

The camera's maximum power consumption is 5.5 Watt.

The dimensioning of the equipment or the supply protection depends on:

- The selected power supply
- The cable length
- The national regulations

The following safety recommendations may serve as a basis:

Supplied power	**Length system cable**	**Recommended protection**	**Comments**
12 V DC	< 100 m	mT1000 mA	In case the camera is supposed to be operated with 12VDC via a cable length of more than 100 meter, please make sure to use an adjustable switch-mode power supply in order to correct potential drops at the lines
24 V DC	100 m < L < 200 m	mT500 mA	

The release current of the protection has to be less than the maximum short-circuit current of the power supply (switch-mode power supply)!

4.2.3 Video picture connection (CVBS)

Depending on the model key, the video signal of the ToughCam® is either provided with wire-end (K option) or with a BNC connector (P option). The CVBS signal is only to be connected with the monitor, the video matrix or the video server.

Connection table (T03-VA-B-XXX-K-L)

Potential:	**Color** (IEC 60757)	**Potential level**	**Profile**	**Comments**
CVBS	WH (BU)	1Vpp	0.25 mm²	
CVBS_GND	BU	0V	2.5 mm²	

Connection table (T03-VA-B-XXX-P-L)

Potential	**BNC - Connector**	**Potential level**	**Profile**	**Comments**
FBAS	Center	1Vpp		No single profile due to BNC connector
FBAS_GND	Ground	0V		No single profile due to BNC connector

4.2.4 Tests prior to switching on voltage

Attention!
Prior to commissioning, all tests as indicated by the national regulations have to be executed. In addition, it is mandatory that the proper functioning of the operating device in accordance with this user manual and all other applicable regulation has been executed.

Attention!
Incorrect installation and operation of the camera may lead to a loss of warranty!

4.3 Step 3: Adjusting the picture

This step is only necessary in case the picture's default settings (angle, focus, iris or backlight settings) do not deliver a suitable picture quality.

Figure 4.4 ToughCam® vario – Lens and sensor

Lens data:

Lens type	Varifocal
Lens	F1,2 / F2,0~360 / 3.8~9.5 mm with galvanometer controlled aperture
Aspheric technology	Yes
Focal distance	3.8 mm - 9.5 mm
Horizontally angle of view	74.2° - 30°
Iris Control	DC
MOD (Min. Object Distance)	0.15 m

Information!
If not determined differently, the default setting for the ToughCam® vario is set to wide angle. With a distance of about 10 meter an object is then focused.
If desired, we customize the ToughCam ® vario's settings to reflect specific requirements. In such a case please advise us at order placement on the requested angle and the object distance.

4.3.1 Work preparation

Attention!
Please carry out any preoperational work carefully and in accordance with the applicable regulations.

Please consider that in order to carry out the applicable settings, a feedback regarding the picture quality is required. Please use appropriate devices (laptop, CCTV tester, walkie-talkie to the control room)

- Use appropriate tools
- Make sure you have a secure foothold
- Avoid static charge

4.3.2 Opening the housing

In case it is necessary to adjust the picture, the housing has to be opened and after completion of the work securely tightened again. Please be very careful and follow thoroughly the steps of this manual.

Stainless steel housing (VA)

Loosen the three screws on the flange of the stainless steel housing. Avoid skin or clothing contact with the screw threads which disposes of LOCTITE (chemical basis: Dimethacrylatester) to secure the screws. It is not allowed to open the sight glass flange.

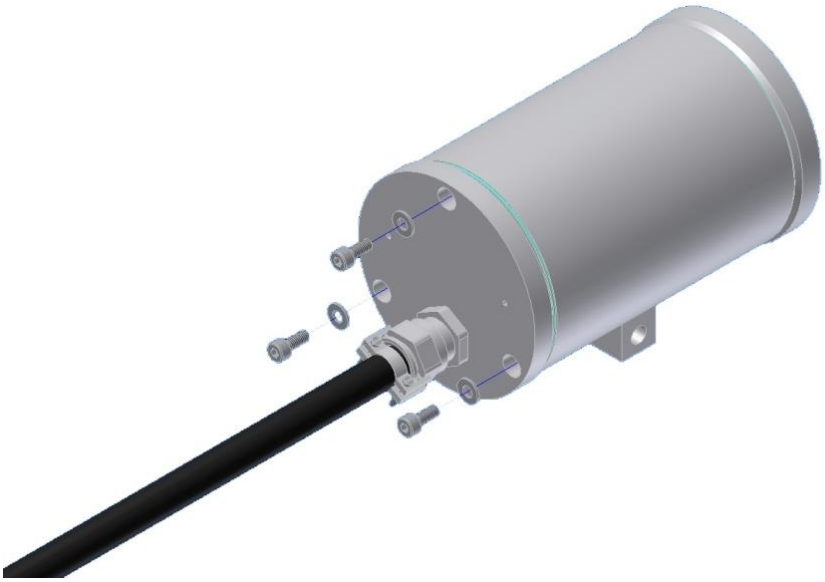


Figure 5.5 Opening of the stainless steel housing (1)

Carefully pull out the lead flange in a straight manner, ensuring that the board module does not tilt. Beware also of tilting. Avoid skin and clothing contact with the cylindrical fit, the surface is treated with lubrication paste (oleaginous).

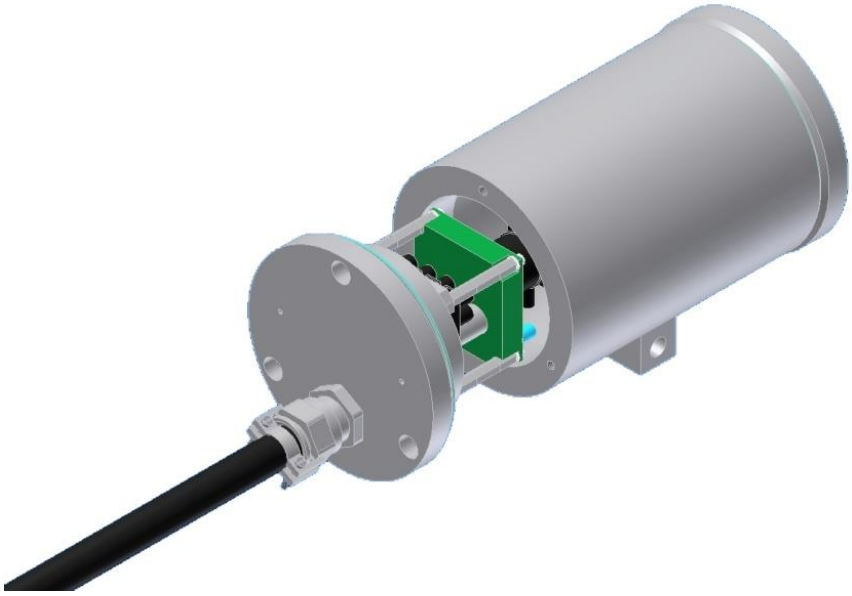


Figure 4.6 Opening of the stainless steel housing (2)

Aluminum die cast housing (AL)

Loosen the three screws at the lock ring (glass flange) of the aluminum die cast housing and carefully take it off.

Figure 4.7 Opening of the AL housing

ATTENTION:
Please make sure not to damage housing sealings

4.3.3 Adjusting the angle (focal distance)

Loosen the knurled screws of the focal distance adjustment (zoom adjustment knob (2)) (q.v. picture below). Adjust the angle by moving the zoom adjustment knob (2) to the left or to the right until the desired focus is reached. Afterwards tightly secure the knurled screws again.

When touching electrical components, potential equalization (grounding of the body) has to be observed (carry a PE wristband etc.)!

4.3.4 Adjusting the focus

Loosen the knurled screws of the focal lens (focus adjustment knob (1)) (q.v. picture below). Adjust the focus of the picture by moving the focus adjustment knob (1) to the left or to the right. Afterwards tightly secure the knurled screws again.

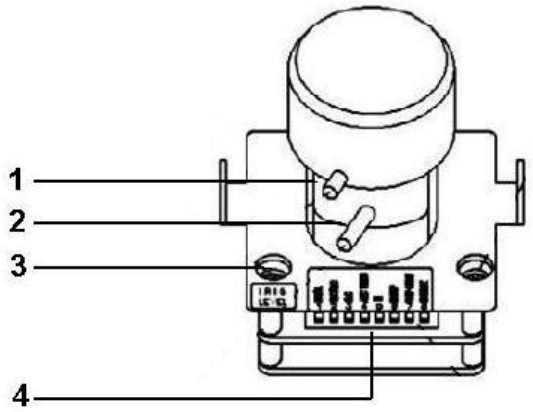


Figure 4.8 Adjustment possibilities of the ToughCam vario

1. Focus adjustment knob
2. Zoom adjustment knob
3. Iris level setting-potentiometer
4. Assignment of functional switches

Nr.	Function	ON	OF
1.	Int / Line-Lock	Internal synchronization	Grid connected synchronization
2.	ELC / ALC	Electronic shutter	Auto-Iris
3.	Back light compensation	BLC ON	BLC OFF
4.	Automatic gain control	AGC Turbo	Normal AGC gain
5.	Flicker free	Flicker free ON	Flicker free OFF
6.	Sharpness setting	Sharp	Normal
7.	Day/Night	Activated	Deactivated
8.	Iteration reduction	Activated	Deactivated

4.3.5 Adjusting the iris level setting-potentiometer

Note!
This step is only required in case that the camera shows a crossfaded or, despite sufficient illumination, signal noising picture.

Adjust the iris level setting-potentiometer (3) in such a manner that the best possible video level is achieved (ELC/ALC switches has to be set on ALC).

4.3.6 Further picture optimization possibilities

It is possible to achieve the optimum picture quality by appropriately adjusting the eight functional switches (4).

4.3.7 Closing of the housing

For closing the housing please, follow, in reversed order, the steps described in chapter 4.3.2 (opening the housing). Particularly concerning the joint, please work very carefully.

Do not lock-in any foreign objects in the housing.

Please make sure that the disassembled screw locks (washer spring DIN7980) are reassembled.

If, when closing the housing, it is noted that the surface of the joint is dirty or not lubricated sufficiently, please clean it with a clean cloth and suitable cleaning detergent. Afterwards, re-lubricate it with a suitable lubrication agent.

Tighten the M4 flange screws with approx. 3 Nm at a non-lubricated thread. Please avoid extensive tightening – this might lead to a torn screw.

5 Maintenance / Servicing / Alterations

The national regulations concerning the maintenance and servicing of electrical devices within hazardous areas are to be observed.

The required maintenance intervals are specific to the individual devices. The operating company has to determine these intervals depending on the application parameters. During maintenance, focus has to be put on checking parts concerning the IP protection category such as the integrity of the housing, the sealings and the cable glands. If maintenance measures are necessary they have to be initiated and/or executed.

6 Repairs and Maintenance

Repairs must only be carried out with original parts of SAMCON Prozessleittechnik GmbH. Repairs must only be carried out by SAMCON Prozessleittechnik GmbH or a qualified electrical technician authorised by SAMCON Prozessleittechnik GmbH in accordance with nationally applied regulations. Rebuilding of or alterations to the devices are not permitted.

7 Disposal / Recycling

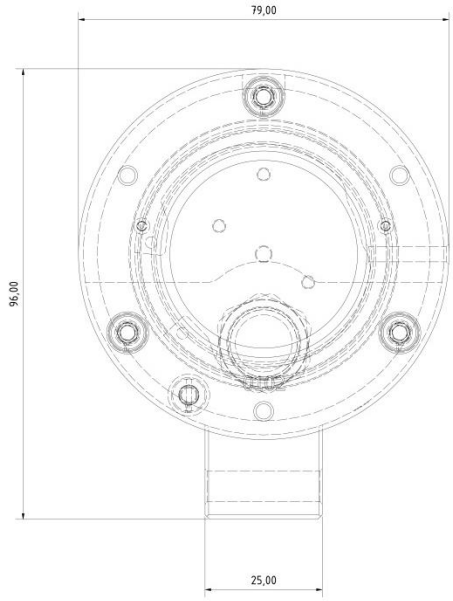
When disposing of the device, nationally applicable regulations must be observed.

This document is subject to alterations and additions.

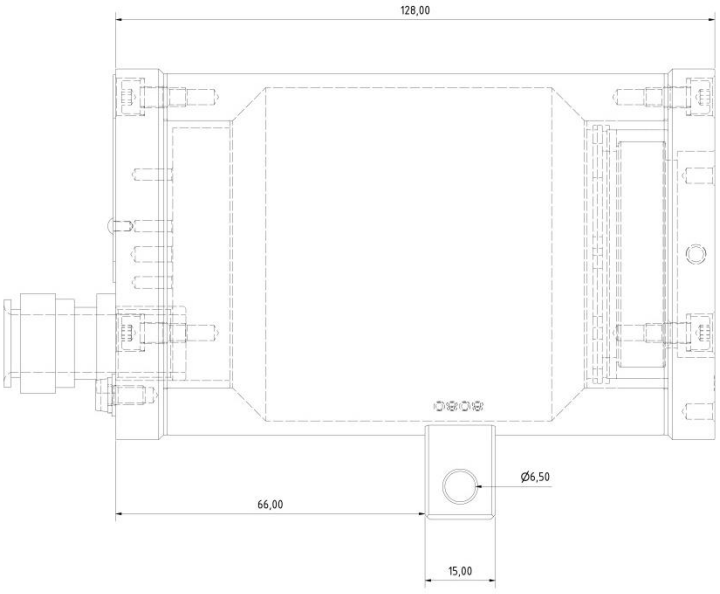
8 Drawings

T03-VA-XX (K1)

Front view

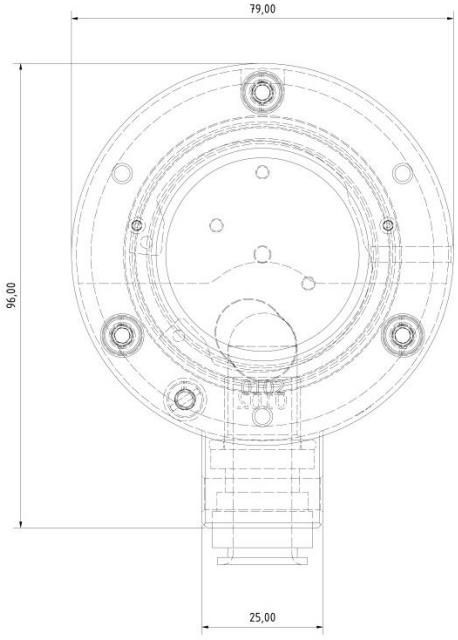


Side view from left

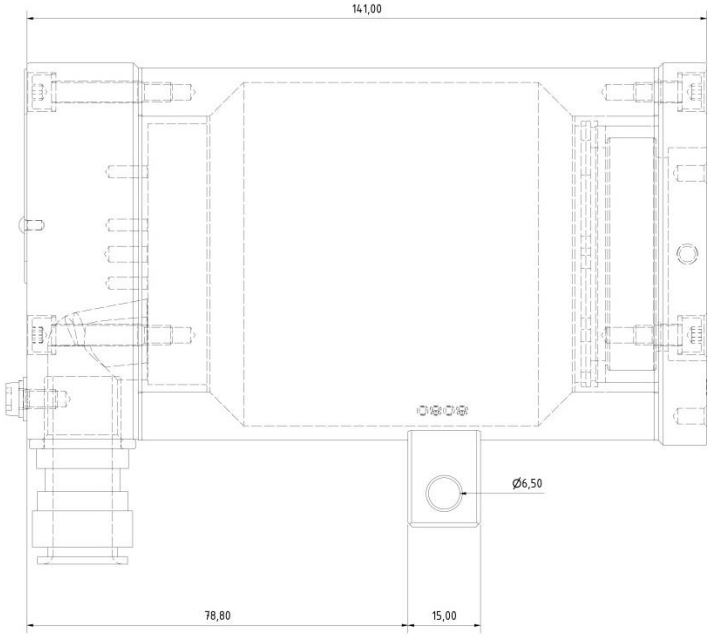


T03-VA-XX (K1)

Front view

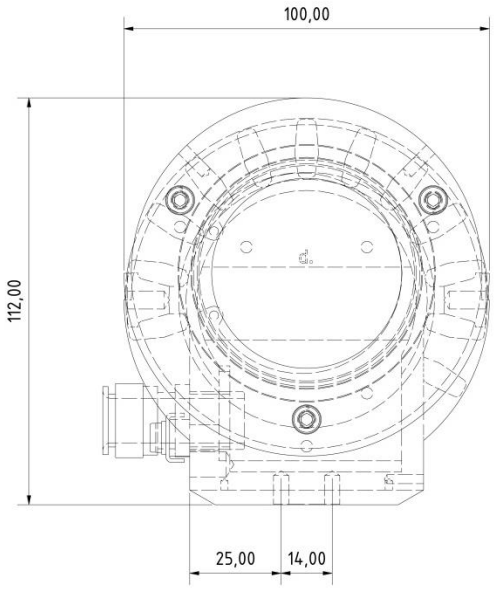


Side view from left

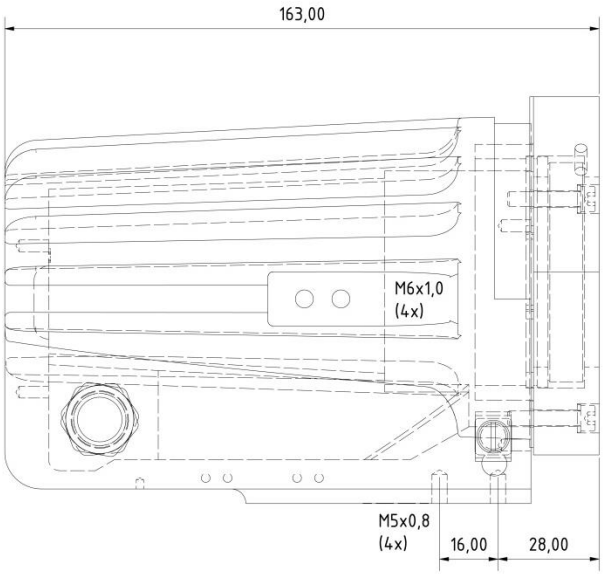


T03-AL-XX (K1)

Front view

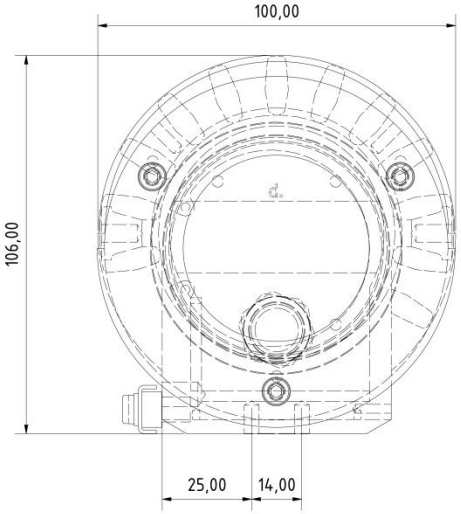


Side view from left

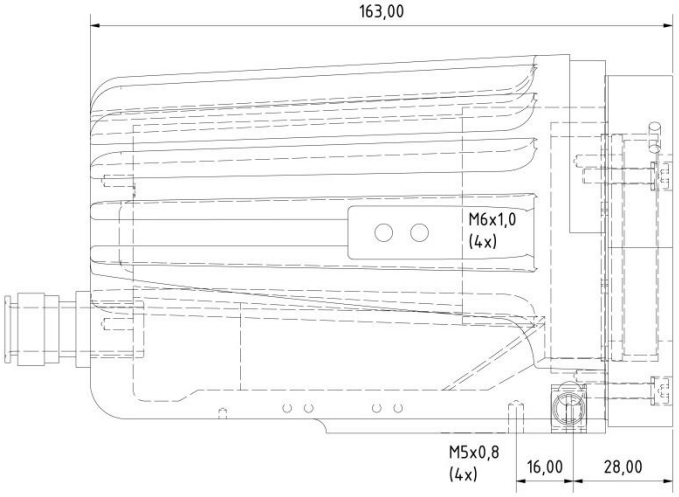


T03-AL-XX (K2)

Front view



Side view from left



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